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AUTHOR Cinnamon, Jerry
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ABSTRACT

This paper outlines management guidelines for outdoor adventure pursuits based on analysis of accident case studies in the literature. Managing risk, to a large degree, involves managing human errors related to natural environmental hazards. The knowledge needed to manage risk may be gained through personal experience (the most dangerous way), education, or the experience of others. Each case study illustrates a human factor that can increase risk and discusses related safety procedures that could minimize the risk. These human factors include: (1) poor judgment due to lack of experience; (2) leader's lack of technical skills, people skills, or environmental knowledge; (3) engaging in unsafe activities because of "tradition"; (4) interpersonal factors that lead to the group splitting up; (5) peer pressure; (6) personal or group goal orientation; (7) the belief that large group size alone can produce safety; (8) pushing the limits of one's skill in critical environmental conditions; and (9) the limited human perspective on natural recurring hazards. The role of guidelines is to establish a barrier between environmental hazards and potential human factors. An appendix outlines guidelines related to leadership, group formation, goals and decision making, and group movement. (SV)

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RISK MANAGEMENT IN HIGH ADVENTURE OUTDOOR PURSUITS

by

Jerry Cinnamon, Ed.D.
Professor of Outdoor Recreation
Unity College in Maine

ABSTRACT:

Risk management guidelines are derived using case studies available in the literature. These case studies are examined based on the educational and personal experiences of the author. Guidelines derived in this manner are applied to a model of accident origin that relates environmental hazards and personal factors. The model shows how these guidelines may be used to attempt to avoid future accidents. The roles of judgment, leaders, traditional practices, intra-personal factors, peer pressure, goal orientation, group size, personal limitations, naturally reoccurring periodic hazards, and reoccurring accidents are examined in the development of this model.

Introduction

As an active outdoors person, I am interested in what causes accidents so that I may avoid them. This article begins with a few general ideas about how to proceed and then examines case studies of the accidents and near-misses of people to illustrate causes and to develop guidelines for realistic risk management. These guidelines will possibly can help avoid future accidents.

It is clear that accidents do happen to individuals who have neither the knowledge skill, nor conditioning to be involved in the activity in which the accident occurs. However, competent and highly skilled people with judgment tempered by experience still have accidents. If skilled outdoor persons can get into an accident, so can we all. If we are to participate safely in the outdoors we must learn how to manage risk.

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Deriving Risk Management Principles

Managing risk, to a large degree, involves managing human errors related to natural environmental hazards. To manage risk we need to gain knowledge through personal experience, education, and the experience of others. An example of learning from personal experience points out the limitations of deriving risk management principles by this method. On New Hampshire's Mt. Washington, my partner and I had spent the evening in the Harvard cabin at tree line and awoke to a chilly 10 degrees in the cabin. We fixed breakfast and noted that with an outside temperature of minus 20 degrees Fahrenheit, our climbing would be limited. Still, since we had the day we walked the mile or so to the base of Huntington Ravine where we emerged from the trees. There was no wind and the sky was clear. We hiked up the lower fan to the base of Damnation gully which is 1500 feet long, mostly of low angle snow and a few ice bulges. After reaching a short vertical ice bulge midway and talking it over, we decided that we could retreat easily if needed. We checked for signs of frostbite that would occur if any wind were to be present. There were none. The rest of the gully was long and uneventful. The gully ended in a short steep wall that ended in the flat alpine garden. As I exited a blast of jet stream wind flattened me. I stood up and was knocked over again. My partner's cheek was frostbitten as he helped me pull up my cargole over my climbing helmet. The new position of the cargole exposed my adam's apple and it was instantly frostbitten by the minus 75 degree windchill. Covering ourselves we raced the quarter mile to the descent gully and dropped out of the wind. This incident taught me many things. First, because we were skilled at ice climbing and experienced on this mountain in winter, we were willing to operate where all factors combined were up against a critical safety barrier. We crossed that barrier and I learned humility. Second, because I set off an avalanche in the descent gully and survived this. I knew that I needed to learn about avalanches. Third, I came to realize that while learning by experience is generally good, I needed to find other ways to learn if I desired to have more experiences. These other ways are, of course, by education and the analysis of the experiences of others.

The role of lack of education in accidents is illustrated by a survey (Couche, 1977) of hikers and climbers on Mt. Hood, a snow-covered and avalanche-prone mountain, which revealed that 92 percent of these recreationalists did not have enough simple knowledge about avalanches to take the most basic precautions to

safeguard themselves. The mechanisms and processes by which avalanches occur are well known. A person who wishes to travel in avalanche country can take courses such as those presented by the National Ski Patrol, among others, to gain both classroom and field experience. In addition, many outdoor organizations offer a wide range of structured experiences to transmit knowledge related to outdoor activities. Knowledge concerning specific natural hazards, such as avalanche paths, that reoccur in a particular area can often be obtained by pre-trip discussions with individuals who know the local area. Education concerning many other aspects of living and working with others in the outdoors is widely available and can be a positive force in preventing accidents.

The experiences of others can be gained through written case studies such as those found in Accidents in North American Mountaineering (Williamson, J., and E. Whalley, 1980), The Base Camp Program and The Mount Hood Accident (Williamson, Harvard, Lev, Bangs, and Shaw, 1986), River Safety Reports (Walbridge, 1986), "A Collection of Accidents and Incidents to Learn From" (Snyder, 1985). The Snowy Torrents: Avalanche Accidents in the United States, 1967-71 (Williams, 1975), Safety Management for Outdoor Program Leaders (Hale, 1984) and Common Practices in Adventure Programming (Johnson, 1984).

Reflections on personal experience, education, and the case studies gives rise to a set of guidelines, presented in a concise form in the Appendix to this paper, that are useful indicators to help form a decision based on all of the data available in any particular situation. This calls for on-the-spot analyses at each stage of a developing situation that places the participant in the heart of decision making. Understanding the reasoning to situations that give rise to the guidelines should help interested persons to utilize or alter them for their own use. The situations and reasoning that led to the guidelines form the remainder of this paper.

Judgment

The first accident case study to be examined involved a rappel failure in a beginning rock-climbing class from a university's Education Department. "The class was practice rappelling. The victim of this accident was making his second descent. Each member of the class had made one descent on the rope which was anchored around a rock. Witnesses described the victim as moving down three meters, then "fidgeting" with the rope, as if there was a problem. The rope "popped" off

the anchor rock. The victim fell about 20 meters and died instantly" (Williamson, J. and S. Rosenbaum, 1983).

The analysis of this accident seems straightforward. If the rappel station had more than one independent anchor, as is common practice, a backup would have prevented total anchor failure. Also, inexperienced rappellers are commonly belayed with the belayer secured by a separate anchor. We can infer that the leader in this situation was unaware of these two safety procedures or did not consider them important. From this we might infer that this leader was relatively inexperienced to lead this type of activity. This accident might have been anticipated by a leader with greater personal experience than required for the specific activity as well as experience in working with groups of beginners in this type of setting.

A guideline for safety then might be that leaders of an outdoor activity should have more experience, knowledge, or skill, than required for the activity at hand. Advanced knowledge and experience allows the leader to anticipate what might go wrong in the situation and to take steps to prevent the accident. This reserve of experience and skill is one component of what we call good judgment. In my opinion,, good judgment based on experience and analysis of each specific situation, rather than written rules to be followed to the letter, is the cornerstone of safe outdoor experiences.

An example of the complexity of applying this guideline occurred in the 1986 Mt. Hood accident. In this accident seven young climbers and two adults died. In the most immediate analysis, the panel established to review this accident found that the climbing leader was capable of leading the normally easy Grade-I ascent, but not capable of leading this same ascent under more demanding storm conditions (Williamson, Harvard, Lev, Bangs, and Shaw, 1986). Complex relationships concerning this accident were recognized by the panel and subsequent authors who have commented on this. Some of these complexities will be discussed later in this paper.

Mentors, Instructors & Leaders

Leadership in a joint-adventure relationship at any particular time and situation might be decided on the basis of whoever has the most technical skill and experience applicable to the situation at hand. In groups of more than two, personal competence in a more general way often underlies the group's often unspoken decision to follow the lead of a specific individual.

Leadership can be fluid, based on trust as well as the dynamics of personal relationships within the group. Since there is no established leader the group might explore how it plans to go about decision making before it enters the out-of-doors. This process might, at the very least, avoid widely differing expectations about the conditions under which a goal will be attempted. The larger the group the more critical these discussions appear to be although this applies even in groups as small as two.

If an individual seeks out a mentor-instructor then more can be said about the qualifications required of a leader. Leading in the out-of-doors requires competence in three distinct areas of responsibility: knowledge of specific outdoor skills, knowledge of the environment, and knowledge of human needs (Raiola, E. and J. Cinnamon, 1989). There has been much debate about which is most important: technical skills, people skills, or knowledge related to the environment. All are essential for the wilderness educator. There also needs to be safety conscious within the context of the activity which may include high adventure types of activities.

Leaders, instructors, or mentors will usually be someone with good communication skills and enough life experiences to place the high adventure activity into perspective regarding the total experiences of life. One of the most common mistakes that occur with a novice leader is that the leader becomes so excited about being outdoors doing a specific activity that the needs of the group become secondary to personal involvement in the activity. Results of this attitude can range from frustration for the leader, to a lowering of the quality of the experience for the participant, to someone being injured. Whether a leader operates with a style that is authoritarian or includes the members of a group in decision-making may also have an impact upon the safety of members of a group (Phipps, 1988).

Tradition

Tradition! In Fiddler on the Roof, tradition was glorified. However, tradition can be a potential cause of accidents. Individuals or groups often have initial doubts about an activity. However, if the first trip or event succeeds without an accident, subsequent doubts are partially dismissed on the basis of past success. This produces a cyclic-reasoning process that allows the activity to continue on the basis of its traditional usage even though it is known to be potentially unsafe. An example is given below of the role of tradition in accidents. A serious near-miss occurred to an Outward

Bound Group (Snyder, 1985) when two instructors were following their students on a final expedition. "...As Alan and Anne were part way across the Catawba River Railroad trestle (150' long and 30' above the river) a train suddenly appeared. Alan at the far end of the trestle, ran to get off the bridge and either leaped for the bank or was hit by the train. He sustained mild abrasions and a concussion and was consequently hospitalized overnight. He was x-rayed for possible head, neck and spinal injuries. Anne was trapped in the middle of the trestle as the train appeared, jumped the railing and hung on to a parallel beam with her pack on until the train passed. She was shaken but did not require hospitalization..." Included in the in-house analysis of this accident is the comment that "This is an example of how we should be constantly questioning the traditional safety procedures. There was even an established trestle crossing procedure that the instructors were following when the incident occurred. Obviously, this was not enough."

Breaking this cycle of traditional but potentially unsafe practice appears to be difficult once it becomes established. One way to break this cycle might be to listen carefully to new voices that question any traditional practices, whether the new voices are those of novices or seasoned practitioners. Some groups establish safety review committees, who have the difficult job of breaking this cycle once it is established.

Intra-Personal Factors

Intra-personal factors are often involved in accidents. As an example, many people hike or ski together for companionship as well as safety. Since members of a group tend to walk or ski at different paces these larger groups often break up into smaller groups of two or three people who travel together and faster or slower than individuals who travel alone. The group as a whole often deals with this by agreeing that everyone will be within sight of each other. However, this often does not happen and in certain cases has led to the death of a member of the party
(Williams, 1975).

A case where a visibility gap occurred involved a group of six college students skiing under conditions of poor visibility starting from a developed ski area and skiing into an adjacent drainage. The victim started out with two others following moments later. The remainder of the party stayed to assist one member with his ski bindings. Two of the first three party members decided to wait for the rest of the group. They thought

that the victim had done the same in the lee of one of the small rolling ridges. Apparently the victim continued and was engulfed in a very small avalanche and was subsequently found to be buried under four feet of snow with a 2-inch thick ice mask around the face and body. Death occurred due to suffocation which is commonly the case in avalanche related accidents. If he had been pulled from the snow quickly he undoubtedly would have been shaken but safe. This is not what happened. His friends saw the small area of avalanched snow, but assumed that it was old avalanche debris and that their friend was still out ahead. Reaching the highway and not finding their friend they initiated a search which resulted in their pulling the lifeless body of their friend from the avalanche. Clearly, just being in proximity of each other is not enough. A basic rule of safety in backcountry travel is that members of the party not lose sight of one another. Some organized groups (Petzoldt, 1984) deal with this problem by having a "guide" who finds the way and a "sweep" whose job is to be the last person of the group. Members of the group remain between these two persons at all times and the guide and sweep can see each other at all times.

Peer Pressure

Goal orientation is a problem of both large and small groups. Many outdoor people seek achievement such as that found in gaining a summit or traversing a wilderness basin. One of the amazing aspects of experience in the outdoors is the extent to which individuals and groups invest in these goals. In the face of trial and danger, peer pressure can sway the group into continuing when individuals have self-doubts about the safety of attempting the goal. Many mountaineers admit self-doubt at the beginning of an important climb that can be overcome both by peer pressure as well as the momentum of starting and the subsequent warming of the body through effort.

Peer pressure is not always positive as Rob Taylor documents in an article about climbing an icicle high on the side of Kilimanjaro's Breach Wall (Taylor, 1978). Against his own best judgment, swayed by the influence of his partner, he continued climbing a dangerously decayed icicle. His tools pulled out and he fell and severely broke his lower leg and ankle. He narrowly escaped death as the team undertook a long harrowing self-rescue followed by a protracted convalescence filled with bitterness toward his partner for decisions made during the climb and off the mountain. Peer pressure, whether positive or negative, is an ever

present factor in our outings. We need to be prepared to act on that knowledge.

Goal Orientation

An accident that took the lives of five climbers on Mt. Cleveland in 1969 (Williams, 1975) points to goal orientation in the face of dangerous conditions as a contributing cause to the accident. Five young climbers, aged 18 to 26, contacted Glacier National Park Ranger Robert Frauson at his home. They planned to climb in the park. Frauson, an experienced mountaineer, tried to persuade them not to climb Mt. Cleveland in winter. He mentioned the severe and unpredictable weather conditions, avalanche hazard, and the time required to obtain rescue service should they need help. Frauson failed to dissuade the group from making the climb, but they did agree to climb the west face rather than the more difficult north face. As verified months later when their bodies were discovered they were caught in an avalanche high on the west face and swept down a water course in one of the predicted avalanches.

Since goal orientation seems such a prominent part of group behavior in the outdoors it might successfully be dealt with openly. This can be done verbally by openly talking about goal orientation before group members invest in a particular goal. It is often useful to have more than one worthwhile goal in mind so that groups do not become locked into a goal made dangerous by environmental and psychological conditions. If the first goal cannot be achieved, then achieving or even taking on another goal becomes the primary experience. I believe that a group on a time budget should pick at least two worthwhile potential goals, one of which is achievable in almost any weather condition. An example, on a trip that I was co-leading our first thought of a goal was to climb New Hampshire's Mt. Washington in order to stand on the top of New England in winter. On previous trips we had been able to do this. However, on any given day winds can be above 100 MPH and avalanches can be part of the experience. So as to avoid the pressure of achieving what might be an unrealistic goal for the group we picked two goals. The second goal was a two day ski cross-country through a tree covered wilderness area. When the final expedition came avalanche conditions and winds up high forced us to give up the climb of Mt. Washington. The cross-country ski was fun and challenging in its own way. Most importantly, in achieving or even taking on this goal it became the primary experience.

Groups and Safety

There are numerous examples of the idea that safety lies in numbers. One of the great tragedies in North American mountaineering involving a large number of climbers happened on Mt. McKinley in 1967 (Snyder, 1973; Wilcox, 1981). Seven climbers of a party of twelve died in a fierce mountain storm. This larger group was composed of a group of nine relatively inexperienced individuals and a group of three with slightly more experience. Rangers of the National Park Service had attempted to strengthen both groups in size and experience by convincing them to join forces. The contributing factors in this accident were many including inexperience, lack of communication and severe weather. However, as the fatal drama was being acted out the National Park Service delayed beginning a rescue attempt because they believed that a large group would be self-sustaining (Snyder, 1973). This did not happen under the severe conditions on the mountain. It is clear that a crisis safety does not lie in numbers but rather in personal competence, good planning, and perhaps a bit of luck.

Approaching Our Limits

Experienced individuals who are high skilled, who have an understanding of the pressures to obtain a goal, who train to overcome fatigue, and who are knowledgeable about natural hazards still have accidents. Many accidents among highly skilled individuals appears to be related to pushing skill limits in critical environmental conditions where a simple mistake crosses the boundary to being serious. Examples of this where deaths have occurred include ice climbing in extremely cold alpine conditions where frostbite and high winds are never far away (Williamson, J. and E. Whalley, 1980), and "ski-jumping" off set boulders in white water kayaking (Walbridge, 1986), where pinning is a real possibility. In more general terms, personal skill and knowledge need to be tempered by humility when there is small room for error. We should not exceed our abilities in an activity and need to understand the dangers of approaching our abilities in the environmental setting at hand. This is especially true when we are entrusted with the lives of others.

A Complex Accident

As an example of a complex accident from which we might learn, I would like to examine the 1986 tragedy on Mt. Hood. In this accident seven students and two adults lost their lives. The climbing team consisted of 15 sophomores of the Oregon Episcopal School and their guides. I think that it might be instructive to examine the viewpoints of two well known mountaineers. David Roberts, an extremely accomplished mountaineer (Roberts, 1986), looks at the accident from the viewpoint of a former head of a college outdoor program. John Roskelly (Roskelly, 1986), who is considered by many to be this country's foremost mountaineer, looks at the accident from the perspective of a guide and his own climbing experiences. David Roberts attempts to fix blame and particularly is concerned with the reason that the students were on the mountain in the first place. Roberts states that "the tragedy in Oregon is compounded by how little free choice the students had. It was not mere peer pressure that forced them on into the fatal blizzard; it was the requirement that they had to go high to graduate, or else face 40 hours of cleaning up parks or visiting nursing homes - the sort of sentence meted out to drug offenders and the like. If a person believes that climbing a mountain will make him a better person, fair enough. But one shouldn't be required to sacrifice one's life to such a dubious proposition."

Teaching mountaineering requires fully informing students of the dangers of mountaineering to the point that they can make rational personal decisions concerning their involvement in above treeline climbing. In addition, these rational decisions also need to be based on experiences in similar but less committing mountaineering situations. Expeditions above treeline where there is not much room for error in the event of a storm should always be based on personal aspirations and ability and not requirements. Even this can be misdirected. The inquiry committee (Williamson, Harvard, Lev, Bangs, and Shaw, 1986) formed by the school reached similar conclusions, and suggested that "related but alternative tasks" ..(goals).."for different levels are probably appropriate."

Natural Reoccurring Hazards

John Roskelly's analysis also seems reasonable once the students are on the mountain. That is, the guide and instructor must make judgements based on the information available to them. He makes a strong case for the competency of the young technical expert and the

validity of the minute by minute decisions once the storm began. Accepting this, I would like to explore here a thesis borrowed from planning for natural hazards such as floods which of course are related to the subject of our concern, storms.

Throughout the United States most communities have established plans to deal with storm-related flooding. The establishment of these plans at a community level lagged long behind scientific knowledge partially because of the easily understandable limitations imposed by the human perspective concerning the reoccurrence of natural phenomena. The disaster plans are based on the knowledge that natural hazards occur and can be predicted in a statistical sense.

Personal perspective of events of low probability that periodically reoccur such as storm-driven floods is usually limited to an individual's experience. A human generation in biological terms is of approximately twenty years duration. A generation of mountaineers may be half of the duration. Our senior public statesmen are 50 to 80 years of age, our senior active mountaineers are usually younger. That means that public memory is too short to recall a periodic and predictable event such as a storm-driven flood that occurs with a low probability such as once every 20 years. As a result, whenever a severe flood occurs, there almost always is a vivid quote from the municipality's mayor or other statesman that this was unexpected and unexperienced in magnitude by even his father or grandfather. Similar statements are heard concerning the Mt. Hood storm. John Roskelly states, "There is obviously one cause and one cause only of this tragedy; the weather. Remember, Sargeant Harder, who had been on every major rescue on Mt. Hood since 1975, said the weather was the worst that he'd ever seen. I believe him." Here, reference is made to 11 years of human memory trying to deal with naturally repeating events of possibly longer duration.
If this storm was only an 11 to 20 year storm it could have been a mild storm by comparison with storms to come that are predictable.

Has American mountaineering seen a more severe storm in which victims have been trapped? Joe Wilcox in his book White Winds (Wilcox, 1981) makes a strong case that the 1967 Mt. McKinley tragedy in which seven climbers dies was the result of the "storm of storms". According to his conclusions the trapped climbing party encountered winds of 80 to 110 miles per hour with peak gusts well above 150 miles per hour. Even during "calm" periods it is doubtful that the climbers trapped near the summit had winds less than 50 to 60 miles per hour. "The most profound characteristic of the storm was that

winds were extreme day after day; too extreme for aircraft to venture near the peak, too extreme for rescue climbers to ascend, too extreme for...the trapped party...to descend. In conclusion, Wilcox states that the "...summit party without slightest doubt, encountered the most severe, high altitude windstorm in all the previous history of McKinley mountaineering." Without reference to the raw data, Wilcox's analysis seems convincing. Since all this is based on 33 years of July observations, however the storm of storms might not even be a 40 year storm let alone a 100 year storm. Surely, there are more of these storms coming.

Where does this leave us? Clearly it should leave us with a change of attitudes. Ordinary storms are bad enough on the mountain but in most climbing areas these are well forecast by the National Weather Service if we only heed their warnings. David Roberts quotes veteran climber Lou Whittaker, who canceled a climb on the day of the Mt. Hood tragedy: "...there is no such thing as a surprise storm." In addition, we should realize that severe storms are reoccurring natural hazards. Even worse, since these are statistical predictions, a severe storm that happened last year has the same probability of occurring this year or the next no matter what happened last year. The Mt. Hood storm was perhaps only a 10 to 15 year storm if we accept the cited memory of Sergeant Harder without digging into archived weather records. In practical terms, this means that the 1986 Mt. Hood storm may have a 6 to 10 percent chance of happening again next year, or the year after that. In this light it does not seem reasonable to start up a mountain in any forecast storm to make the most out of an attempt.

Reoccurring Accidents

As a revealing example of the nature of accidents, I wish to examine a reoccurring accident that occurs in Grand Teton National Park. That is, from time to time, the same environmental and human factors come together in the same place to produce an accident involving different people at the same place.

Symmetry Spire is probably the most popular climb in Grant Teton National Park, principally because it is the most accessible. "It offers the option of an easy scramble via a couloir, or any one of a series of progressively demanding rock routes."..."The most tragic accident" of the 1971 season claimed three lives (Smutek, 1972). "The trio was descending the Symmetry Spire Couloir, and glissaded into a deep moat which had formed at a cliff. There they were trapped by snow

falling in around them. The snow also dammed the stream that ran beneath the snow surface, filling the moat with ice water." This particular accident has occurred repeatedly, each time involving different people. The last time occurred in 1982. In this case (Williamson, J., and Rosenbaum, 1983) four hikers belonging to a college geology course climbed to the Symmetry Spire-Ice Point col after being warned against doing so by their group leader. "After a brief stop at the col, the four started down, electing to slide"..."The slope began to steepen and soon the group was only in marginal control. Their descent route"..."was channeled into a narrow snow chute that ended in an 18-meter waterfall and moat." One of the group "saw the moat and was able to grab some bushes and stop himself but was unable to hold"...a second member..."who slid over the falls and into the moat." The first member yelled to a third member..." and, at the last moment, he was able to vault the moat and land downslope from the falls." The first member then grabbed the fourth member and was able to hold on to him. The victim was later found..."At the bottom of the waterfall,, about 15 meters into the moat"...He was lying face down in about 15 cm. of water, with massive head injuries and showing no signs of life."

Undoubtedly, this accident will happen again. It will happen in those years that a moat opens up as the snow pack begins to disappear. Individuals unaware of previous accidents at this spot will see a gentle but deceptive icy slope above the waterfall and moat and attempt to glissade down it. They will not be able to control their speed and direction in the icy trough that leads into the moat. Death will be either by concussion or drowning. When the accident does occur again it will be declared a tragedy. And it will be in the Shakespearean sense, in that the exact dangers are known and yet the accident reoccurs.

A Model of Accidents

As shown by the case studies examined, accidents happen when people interact unwisely with a natural environment that contains the necessary potential ingredients for an accident to occur. Therefore, the two factors that are common to accidents are environmental hazards and human factors (Hale, 1984). The role of guidelines in preventing accidents is to establish a barrier between these environmental hazards and unwise human actions that stem from the human factors.

The last guideline, is that the environment, on one hand, with its steep slopes, avalanches, loose rock, gravity, storms, lightning, and other reoccurring

natural hazards exist in an ongoing dynamic interaction. On the other hand, what we take into the wilderness are personal factors such as knowledge and skill, personal and group goal orientation, peer pressure and group dynamics, physical conditioning or fatigue, and a limited human perception of the time scale and processes involved in reoccurring natural events. Accidents occur when human and environmental hazards come together in a dangerous manner. The role of guidelines, judgment, and experience is to prevent this interaction.

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APPENDIX

GUIDELINES TO RISK MANAGEMENT IN HIGH ADVENTURE OUTDOOR PURSUITS

Leaders and Participants

(1) Leaders of an outdoor activity should have more experience, knowledge, or skill than required for the activity at hand. This additional experience gives the leader a cushion of knowledge, and skill to handle the experience at hand if anything should go wrong. Importantly, advanced knowledge and experience allows the leader to anticipate what might go wrong in the situation and to take steps to prevent the accident. This reserve of experience and skill is one component of what we call good judgment. Good judgment is based on experience and analysis of each specific situation rather than written rules to be followed to the letter. This is a cornerstone of safe outdoor experiences.

(2) We should not exceed our abilities in an activity and need to understand the dangers of approaching our abilities in the environmental setting at hand. This is especially true when we are entrusted with the lives of others.

(3) A novice needs to work with a skilled mentor concerned with the novice's well-being. Leaders, instructor, and mentors need to have technical skills, people skills and knowledge related to the environment. The mentor needs to be safety conscious within the context of the activity, whether that activity is mountaineering or another high adventure outdoor activity. This will usually be someone with good communication skills and enough life experiences to place the technical pursuit into perspective regarding the total experiences of life. Leadership style may have a direct impact upon the safety of a group.

Groups

(1) Objectives need to fit the physical fitness and abilities of the group. Related but alternative goals for different levels of fitness are appropriate. Participants in joint-adventure pursuits should be physically trained for conditions expected in attempting a particular goal, to

avoid fatigue that may affect motor control and decision making. Illness and hypothermia lead to an inability to make safe decisions.

(2) Safety does not lie in numbers but rather in personal competence and good planning.

Goals & Decisions

(1) Goal orientation is a normal function of groups and may be positive or negative in its effects. Since goal orientation seems such a prominent part of group behavior in the out-doors it might successfully be dealt with openly.

(2) Peer pressure, whether positive or negative, is an ever present factor in our outings with others and leaders need to be prepared to act on that knowledge to our own and the groups best interest.

(3) Groups on a time budget should pick at least two worth while potential goals, one of which is achievable in almost any weather conditions by all members of the group. If the group does split up, each group should be under competent leadership and contain enough internal strength to reach its goal safely.

(4) Expeditions above tree line and in other situations where there is not much room for error in the event of a storm should always be based on personal aspirations and ability and not requirements.

(5) Members of joint-adventure relationship will benefit by discussing decision making questions and procedures before heading out. This will establish that a consultation or process is expected when important decisions are to be made.

Movement

(1) A basic rule of safety in backcountry travel is that members of the party not lose sight of one another.

(2) Novices or experienced practitioners should be encouraged to question traditional practices of long standing since long use may have habituated practitioners to their unwise use. Severe storms and other natural hazards reoccur in a natural cycle. "Traditional practices" of 10 to 20 years standing have not as yet experienced the full cycle